WHAT IS CLAIMED IS:

1. A method of processing an input image, comprising:

computing spatially-shifted forward transforms of the input image, each forward transform being computed based on a denoiser transform Z having an associated transpose Z', wherein a matrix multiplication between Z and Z' produces a diagonal matrix Λ, $Z = F(D)$, F specifies a mapping from coefficients of D to coefficients of Z, and D substantially corresponds to a frequency-domain transform;

denoising the forward transforms based on nonlinear mappings derived from quantization values linked to the input image;

computing spatially-shifted inverse transforms of the denoised forward transforms, each inverse transform being computed based on Z and Z'; and

computing an output image based on a combination of spatially-shifted inverse transforms.

2. The method of claim 1, wherein D is a block-based linear transform.

3. The method of claim 2, wherein the spatially-shifted forward transforms are computed based on different respective blocking grids and the spatially-shifted inverse transforms are computed based on blocking grids used to compute corresponding spatially-shifted forward transforms.

4. The method of claim 2, wherein D is a discrete cosine transform.

5. The method of claim 3, wherein D is a one-dimensional discrete cosine transform.

6. The method of claim 5, wherein F is an arithmetic operator.

7. The method of claim 6, wherein F is a rounding arithmetic operator.

8. The method of claim 1, wherein F is a mapping from coefficients of D to corresponding coefficients of Z having values selected from 0 and $\pm 2^N$ where N has an integer value.

9. The method of claim 1, wherein F is a mapping from weighted coefficients of D to corresponding coefficients of Z.

10. The method of claim 9, wherein the coefficient of D are weighted by a common scaling factor.

11. The method of claim 10, wherein F corresponds to a rounding operator applied to the weighted coefficients of D.

12. The method of claim 10, wherein the nonlinear mappings are derived from quantization values weighted by the common scaling factor.

13. The method of claim 9, wherein the forward transforms are denoised based on nonlinear mappings derived from quantization values linked to the input image and weighted by respective scaling factors.

14. The method of claim 1, wherein the forward transforms are computed based on a factorization of Z.

15. The method of claim 1, wherein the input image corresponds to a decompressed version of an input image compressed based on a given quantization process and the forward transforms are denoised based on the given quantization process.

16. The method of claim 1, wherein the forward transforms are denoised by setting to zero each forward transform coefficient with an absolute value below a respective threshold derived from a respective quantization value linked to the input image and leaving unchanged each forward transform coefficient with an absolute equal to at least a respective threshold derived from a respective quantization value linked to the input image.

17. The method of claim 16, further comprising sharpening the forward transform coefficients by increasing nonlinear transform parameters by respective factors that are larger for higher spatial frequency forward transform coefficients than for lower spatial frequency forward transform coefficients.

18. The method of claim 1, wherein the output image is computed from a weighted combination of the inverse transforms.

19. The method of claim 18, wherein the computed output image corresponds to an average of the inverse transforms.

20. The method of claim 1, wherein computing the output image comprises computing a base image from a combination of inverse transforms.

21. The method of claim 20, wherein the base image has pixel values corresponding to respective averages of values of corresponding pixels in the inverse transforms.

22. The method of claim 20, wherein computing the output image further comprises computing a ringing correction image based at least in part on computed measures of local spatial intensity variability for pixels of each of the inverse transforms.

23. The method of claim 22, further comprising assigning to each pixel in the ringing correction image a value of a corresponding intermediate image pixel having a lowest computed measure of local spatial intensity variability of the corresponding intermediate image pixels.

24. The method of claim 22, further comprising assigning to each pixel in the ringing correction image a value corresponding to an average of multiple corresponding intermediate image pixels in a lowest percentile of local spatial variability measures of the corresponding intermediate image pixels.

25. The method of claim 22, wherein the output image is computed by combining pixel values from the base image and the ringing correction image.

26. The method of claim 25, wherein the output image is computed by a weighted combination of the base image and the ringing correction image.

27. The method of claim 14, wherein the base image contribution to the output image is less than the ringing correction image contribution for pixels adjacent to transition regions in the base image.

28. A system for processing an input image, comprising:

a forward transform module configured to compute spatially-shifted forward transforms of the input image, each forward transform being computed based on a denoiser transform Z having an associated transpose Z', wherein a matrix multiplication between Z and Z' produces a diagonal matrix Λ, $Z = F(D)$, F specifies a mapping from coefficients of D to coefficients of Z, and D substantially corresponds to a frequency-domain transform;

a nonlinear denoiser module configured to denoise the forward transforms based on nonlinear mappings derived from quantization values linked to the input image;

an inverse transform module configured to compute spatially-shifted inverse transforms of the denoised forward transforms based on Z and Z'; and

an output image generator module configured to compute an output image based on a combination of spatially-shifted inverse transforms.

29. A system for processing an input image, comprising:

means for computing spatially-shifted forward transforms of the input image, each forward transform being computed based on a denoiser transform Z having an associated transpose Z', wherein a matrix multiplication between Z and Z' produces a diagonal matrix Λ, $Z = F(D)$, F specifies a mapping from coefficients of D to coefficients of Z, and D substantially corresponds to a frequency-domain transform;

means for denoising the forward transforms based on nonlinear mappings derived from quantization values linked to the input image;

means for computing spatially-shifted inverse transforms of the denoised forward transforms, each inverse transform being computed based on Z and Z'; and

means for computing an output image based on a combination of spatially-shifted inverse transforms..

30. A machine-readable medium storing machine-readable instructions for causing a machine to:

compute spatially-shifted forward transforms of the input image, each forward transform being computed based on a denoiser transform Z having an associated transpose Z', wherein a matrix multiplication between Z and Z' produces a diagonal matrix Λ, $Z = F(D)$, F specifies a mapping from coefficients of D to coefficients of Z, and D substantially corresponds to a frequency-domain transform;

denoise the forward transforms based on nonlinear mappings derived from quantization values linked to the input image;

compute spatially-shifted inverse transforms of the denoised forward transforms based on Z and Z'; and

compute an output image based on a combination of spatially-shifted inverse transforms.